

RESEARCH OF DRIVING CAPACITY ON METHADONE MAINTENANCE

Submitted September 23, 2020

Clinical Trial Drug Alcohol Depend

. 2003 Dec 11;72(3):271-8. doi: 10.1016/j.drugalcdep.2003.08.002.

The effects of the opioid pharmacotherapies methadone, LAAM and buprenorphine, alone and in combination with alcohol, on simulated driving

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PMID: 14643944 DOI: 10.1016/j.drugalcdep.2003.08.002

Abstract

While methadone is currently the primary pharmacotherapy used in the treatment of heroin dependence in Australia, levo-alpha-acetyl-methadol (LAAM) and buprenorphine are new pharmacotherapies that are being examined as alternatives to methadone maintenance treatment. The aim of this research is to consider the effects of the methadone, buprenorphine and LAAM, as used in maintenance pharmacotherapy for heroin dependence, upon simulated driving. Clients stabilized in methadone, LAAM and buprenorphine treatment programs for 3 months, and a control group of non-drug-using participants, took part in this study which involved operating a driving simulator over a 75 min period. All participants attended one session without alcohol and one session with alcohol at around the 0.05% blood alcohol level. Simulated driving skill was measured through standard deviations of lateral position, speed and steering wheel angle, and reaction time to a subsidiary task was also measured. **While alcohol impaired all measures of driving performance, there were no differences in driving skills across the four participant groups. These findings suggest that typical community standards around driving safety should be applied to clients stabilized in methadone, LAAM and buprenorphine treatment.** The findings are important in terms of the widespread implementation of these treatment options in Victoria given that a large proportion of pharmacotherapy clients drive.

Comparative Study Eur Addict Res

. 2004;10(2):80-7. doi: 10.1159/000076118.

Maintenance therapy with synthetic opioids and driving aptitude

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PMID: 15004452 DOI: 10.1159/000076118

Abstract

Aims: To assess the influence of methadone and buprenorphine maintenance treatment on the driving aptitude of opioid-dependent patients.

Design: Prospective, open label, outpatient maintenance, single-blind (investigator) study.

Participants and setting: Thirty opioid-dependent patients maintained on either methadone or buprenorphine were recruited from the drug-addiction outpatient clinic in Vienna.

Measurements: The traffic-relevant performance dimensions of the participants were assessed 22 h after receiving synthetic opioid maintenance therapy, by a series of seven tests constituting the Act & React Test System (ART) 2020 Standard test battery, developed by the Austrian Road Safety Board (ARSB). To test for additional consumption of illicit substances, blood and urine samples were taken at the beginning of the tests.

Findings: The patient group only differed from control subjects in two of the ART 2020 Standard tests. During a task to test the subject's attention under monotonous circumstances (Q1 test), patients had a significantly greater number of reactions ($p = 0.027$) and a significantly higher percentage of incorrect reactions than control subjects. When driving in a dynamic environment (DR2 test) patients had a significantly longer mean decision time ($p = 0.029$) and mean reaction time ($p = 0.009$) compared with control subjects. Interestingly, when separated into treatment groups, the mean decision and reaction times of buprenorphine-maintained patients in the DR2 test did not differ from controls, whereas patients maintained on methadone showed significantly prolonged mean decision ($p = 0.009$) and reaction times ($p = 0.004$). In this same test, patients who had consumed additional illicit drugs had a longer mean reaction time compared with control subjects ($p = 0.036$).

Conclusion: The synthetic opioid-maintained subjects investigated in the current study did not differ significantly in comparison to healthy controls in the majority of the ART 2020 Standard tests.

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Comparative Study Eur Addict Res

. 2007;13(3):127-35. doi: 10.1159/000101548.

Influence of peak and trough levels of opioid maintenance therapy on driving aptitude

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PMID: 17570908 DOI: 10.1159/000101548

Abstract

To evaluate driving aptitude and traffic-relevant performance at peak and trough medication levels in opioid-dependent patients receiving maintenance therapy with either buprenorphine (mean: 13.4 mg) or methadone (52.7 mg) and a medication-free control group, the Addiction Clinic at Medical University

Vienna conducted a prospective, open-label trial where 40 opioid-dependent patients maintained either on buprenorphine or methadone were assessed regarding their traffic-relevant performance. Using the standardized Act and React Testsystem (ART) 2020 Standard test battery, traffic-relevant performance was analyzed 1.5 h (peak level) and 20 h (trough level) after administration of opioid maintenance therapy. Results showed that patients at trough level had a significantly higher percentage of incorrect reactions ($p = 0.03$) and more simple errors ($p = 0.02$) than patients at peak level as well as methadone-maintained patients at peak level tended to perform less well than buprenorphine-maintained patients in some of the test items, e.g. methadone-maintained patients at trough level had a higher number of delayed reactions in the RST3 phase 2 test ($p = 0.09$) and answered fewer questions correctly in the visual structuring ability test ($p = 0.04$). This investigation indicates that opioid-maintained patients did not differ significantly at peak vs. trough level in the majority of the investigated items and that both substances do not appear to affect traffic-relevant performance dimensions when given as a maintenance therapy in a population where concomitant consumption would be excluded.

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Driving under the influence (DUI) among patients in opioid maintenance treatment (OMT): a registry-based national cohort study

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Affiliations expand

PMID: 23773400 DOI: 10.1111/add.12275

Abstract

Aims: To investigate convictions for driving under the influence (DUI) before, during and after opioid maintenance treatment (OMT) and to examine factors associated with convictions for DUI during treatment.

Design, setting and participants: Treatment data on all patients who started OMT in Norway between 1997 and 2003 ($n = 3221$) were cross-linked with national criminal records using unique person identifiers. Patients were followed over a 9-year period, before, during and in periods out of opioid maintenance treatment.

Measurements: Data were formal charges leading to convictions recorded during four different time-periods: 3 years prior to application, waiting-list, in-treatment and in periods out of treatment.

Findings: During OMT, convictions for DUI were reduced by almost 40% compared with pre-application levels. The conviction rate for DUI for males in the pre-application period was 9.59 per 100 person-years (PY) and for females, 3.44 per 100 PY. During OMT, rates of DUI convictions were reduced to 5.97 per 100 PY among men and to 1.09 per 100 PY among women. However, when estimating the effect of OMT on convictions for DUI, the interaction between gender and exposure to OMT was not statistically significant. Patients who remained in continuous treatment had fewer convictions for DUI during treatment compared with patients in discontinuous treatment. Compared with patients having no road traffic convictions during the pre-application period, patients with two or more pre-application

convictions for DUI had higher odds [odds ratio (OR) = 3.69 (2.30-5.93)] for further convictions for DUI during OMT.

Conclusion: In Norway, patients receiving opioid maintenance treatment (OMT) have reduced convictions for driving under the influence (DUI) compared with their pre-treatment levels. Being male and having a previous history of several convictions for DUI were found to be important risk factors for convictions for DUI during OMT.

Keywords: Buprenorphine; driving under the influence (DUI); maintenance treatment; methadone; opioid; treatment engagement.

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Schweiz Med Wochenschr

. 1998 Oct 10;128(41):1538-47.

[Driving fitness/driving capacity of patients treated with methadone]

[Article in German]

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PMID: 9816613

Abstract

To answer the question whether or not therapeutic methadone doses significantly reduce traffic-related performance of drivers on medically supervised methadone programs, 34 methadone substitution patients, all of them volunteers, were subjected to a test series: the focus of the study was a psychophysical test battery consisting of 10 individual performance tests to assess essential functions with regard to driving ability, such as concentration, attention, reaction capability, memory, perception and sensorimotor coordination. In evaluating the results of the psychophysical tests, multiple drug use and subjective methadone influence at the time of the examination were taken into consideration but current methadone blood level was neglected. The results were compared to those of a control group. The methadone group (n = 34) consisted of 25 men and 9 women aged between 18 and 38. At the time of the study, the majority of the test persons (29) were on low dosage methadone maintenance (up to 60 mg/day). In the urine samples of approximately 2/3 of the test persons, evidence was found for multiple drug use together with other psychotropic substances, the most frequent (14) being cannabis metabolites. Referring to their driving practices, a mere 4 out of 29 drivers had not committed any driving offences. A comparison of the psychophysical performance of the whole methadone group (n = 34) with a control group demonstrated that the methadone substitution patients achieved rather lower results in almost all variables. These performance deficits were particularly conspicuous in sustained attention, sensorimotor coordination and reaction capability. 12 "methadone only" participants, i.e. methadone probands without any additional consumption of psychotropic substances showed-partly considerably better performance than the methadone group as a whole and also achieved normal

results in relation to the test norm. Nevertheless, once again, results tended to be of lower level in comparison to the control group. "Methadone only" substitution patients, in particular those volunteers without a current subjective methadone influence-reached practically the same results as the corresponding control subjects, or at least average results based on test norm. However, the study revealed distinctive performance impairment (e.g. in sustained attention, reaction capability) when other psychotropic substances (including alcohol and cannabis!) were taken as well during the subjective methadone phase. The performance deficits were predominantly caused by a slowing down of reactions. Our study illustrates that, under certain conditions, long-term methadone maintenance under strict medical supervision does not have any significant unfavorable impact on the psychophysical performances in driving ability as examined in this study. Thus, these research findings support the previous Zurich experiences, according to which driving ability--and in the end also driving aptitude--of the methadone substitution patients does not depend on the methadone therapy itself, nor on the amount of the daily methadone intake. In making the final medical judgement on driving ability, the presence of a mixed drug use and the personality of the person in question are of far greater importance.

Clinical Trial Nervenarzt

. 1999 May;70(5):457-62. doi: 10.1007/s001150050462.

['Methadone substitution therapy and driving'. Results of an experimental study]

[Article in German]

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PMID: 10407842 DOI: 10.1007/s001150050462

Abstract

The aim of our experimental study was to gain information and data on the driving ability of patients undergoing a methadone substitution program as well as to explore the influence of an HIV infection. 28 patients, five of them HIV-positive, were compared to a control group equal in age, sex and education. For the traffic relevant tests the methadone patients showed significantly reduced performance. Six of the methadone patients passed the tests in a way regarded to have sufficient driving skills. We were unable to prove an influence of HIV infection on driving skills when lacking relevant somatic and neuropsychiatric symptoms. There was no significant correlation between the test results and patients age or dose of medication. We conclude that in general methadone substitution does not implicate driving inability although the majority of our patients showed some reduction of their psychomotor skills.

Am J Drug Alcohol Abuse

. 1977;4(1):91-100. doi: 10.3109/00952997709002750.

Driving records before and during methadone maintenance

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PMID: 612193 DOI: 10.3109/00952997709002750

Abstract

We compared the motor vehicle driving records of 104 former heroin users during 1 year of heroin use before admission to methadone maintenance with their records during 1 year after admission while they were maintained on methadone. We found a statistically significant increase in convictions for speeding from the year on heroin to the year on methadone, but no significant change in convictions for negligent collision, other moving violations, driving without a license, and in accidents. The results suggest that heroin users have slightly better driving records on heroin than they do on methadone, possibly because on heroin they drive with special care to avoid arrest. The frequency with which our subjects were involved in accidents did not differ significantly from that of all Texas licensed drivers. **On the basis of this study we recommend no restriction of the driving privilege of persons maintained on methadone.**

Review Drug Alcohol Rev

. 2000 Dec;19(4):427-439. doi: 10.1080/713659417.

Opioid dependence and driving ability: a review in the context of proposed legislative change in Victoria

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PMID: 28474453 DOI: 10.1080/713659417

Abstract

There is debate in Victoria, Australia concerning the effects of various drugs, including opioids, on driving skills and accident rates, and the development of appropriate legislative responses. There are legislative difficulties around drugs and driving because of the lack of adequate epidemiological and performance-based studies. In relation to opioids, although there are studies that have shown the prevalence of opioids in both non-fatal and fatal crashes, these studies do not demonstrate that the use of opioids is associated with any elevated crash risk and they fail to take into account issues regarding tolerance. **A review of the performance studies, including only a small number of driving studies, suggests that opioids, and in particular methadone, have limited effects on driving skills. None the less, recommendations have been made in other countries, such as Germany, that place driving restrictions upon methadone clients.** This paper reviews the available evidence concerning the effects of opioids on driving skills and accident risk, with reference to the proposed changes to legislation in the area of drugs and driving in Victoria.

Keywords: driving; legislation; opioids.

2000 Australasian Professional Society on Alcohol and other Drugs.

Review Eur Addict Res

. 2000 Mar;6(1):8-19. doi: 10.1159/000019004.

Cognitive-motor performance of methadone-maintained patients

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PMID: 10729738 DOI: 10.1159/000019004

Abstract

Fifty-four methadone-maintained patients and 54 healthy controls, matched for age, gender and educational attainment, completed a battery of six cognitive-psychomotor performance tests. Results of previous studies were replicated in four areas. An attention task was performed less well by patients [mean difference more than 0.7 standard deviations (SD)] as was a tachistoscopic perception task (0.3 SD). On a simple-choice reaction test, patients showed higher speed in decision making and motor reaction as well as an increased number of decision errors (0.3 SD each). Performing a tracking test, patients showed less deviations (0.4 SD) combined with more time needed (0.8 SD). Our data go beyond previous (seemingly inconsistent) research findings by showing that patients did less well by more than 0.6 SD when on higher speed levels. Absolving a test on visual structuring, more patients than controls achieved a 100% accuracy level (52 vs. 30%), but at the same time patients were slower (0.6 SD) than controls. **An inferior test performance of patients in methadone maintenance treatment has been confirmed in some areas, especially in attention. However, the fairly moderate size of these effects and the fact that in the majority of measures the observed variance was better explained by sociodemographic features than by group membership lead on the conclusion that belonging to the group of methadone patients alone is not necessarily sufficient to predict an impairment in cognitive-psychomotor skills.** To conclude, assessment of fitness for certain tasks or occupations should be done individually for each patient and should take into account comorbidity, including the extent of alcohol and other drug use.

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NDARC Technical Report No. 3 (1989) UNSW, Sydney

The effects of methadone as used in a methadone maintenance program, on driving-related skills

image - TR Image 280 2 313

Author: Greg Chesher, Jim Lemon, Michelle Gomel, Glen Murphy

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ABSTRACT

A study was undertaken to examine the effects of methadone, as used in the methadone maintenance program, on human performance skills which are related to those required to drive a motor vehicle with safety.

The tests used for the study were chosen for their relevance to driving as well as for the distinctive properties of the opioids.

Three groups of volunteers from the methadone programs in Sydney were chosen to represent various stages of progress by clients within the program. These were (i) those beginning on the program; (ii) those receiving an increase in dosage of 10 mg methadone; and (iii) those who have been stabilized on a dose of methadone for a period of at least six months.

The interaction between methadone and two other drugs commonly used by clients on a methadone program were also examined. These were (i) alcohol, to produce a mean blood alcohol concentration at peak of 0.064 g per 100 ml blood; and (ii) a therapeutic dose of the benzodiazepine, diazepam (15 mg).

The mean dose of methadone taken by all of the clients within the study was 70 mg (range 15 to 150 mg). The mean dose for the individual groups was (i) stabilized group, 85 mg (range 40 to 150 mg); (ii) increased dose group, 67 mg (range 40 to 135 mg); and (iii) those beginning the program, 38 mg (range 15 to 60 mg).

Two control groups were employed: a group of ex-users of heroin who were drug-free and a group of non-opioid users.

Volunteers for the control groups and the stabilized methadone group attended the laboratory on four occasions (days). On days 1 and 2, all subjects after practice on the tests, completed the test battery twice, before and after the methadone clients had received their daily dose of methadone. An interval of one hour was allowed after the methadone dose to allow time for absorption. On day 3 all clients from the control groups and the stabilized methadone groups received alcohol and on day 4, diazepam.

The test battery proved to be sensitive to the effects of alcohol and diazepam at the doses used.

There was no evidence for an effect of the acute dose of methadone on any of the experimental groups of clients on the methadone program. The insensitivity of these tests of skill performance to the acute effect of methadone on the clients within the methadone maintenance program indicates that these clients should not be considered as impaired in their ability to perform complex tasks such as driving a motor vehicle.

Both alcohol and diazepam produced a significant decrement in the performance on the test battery by the control groups and the stabilized methadone clients. However, there was no difference in the intensity of this effect between the groups. There was no evidence for an interaction between methadone and either alcohol or diazepam in the group of methadone clients stabilised on the program.

The overall scores on the test battery showed a trend to poorer performance by the methadone clients. This difference achieved significance for the stabilized group of methadone clients. However, the differences in overall performance between the methadone groups and the controls were considerably smaller than those produced by the acute doses of alcohol or diazepam.

These differences in overall performance were not attributable to the acute dose of methadone. The possibility that they are related to a chronic effect of methadone was examined. There was a correlation between the methadone dose and the overall performance measure, but this accounted for only 8% of the variance and was not the most important variable associated with this effect.

There was no difference in the performance of those stabilised methadone clients who received less than 80 mg methadone, from those who received 80 mg or more per day. The dose of 80 mg methadone is that considered in the National Methadone Guidelines (1988) as being the threshold dose for what is described as a "high dose".

It is considered that the differences in overall performance between the methadone clients and the controls can be interpreted in a manner which does not involve the pharmacological effects of methadone. It is suggested that factors including unemployment, life-style, social and personality disorders could play a contributory role.

Institute for Metropolitan Affairs

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DRIVING RECORD OF METHADONE MAINTENANCE PATIENTS IN NEW YORK STATE

BABST, D., NEWMAN, S., & State, N. (1973). DRIVING RECORD OF METHADONE MAINTENANCE PATIENTS IN NEW YORK STATE. DRIVING RECORD OF METHADONE MAINTENANCE PATIENTS IN NEW YORK STATE,

When a comparison was made within specific age groups, it was learned that the accident and conviction rates were about the same for methadone maintenance clients as for a sample of New York City male drivers within the same period. The findings from other related studies discussed in this booklet are consistent with the results in this study.

Methadone-substitution and driving ability

Forensic Science International, Volume 62, Issues 1-2, November 1993, Pages 63-66

H. Rössler, H. J. Battista, F. Deisenhammer, V. Günther, P. Pohl, L. Prokop and Y. Riemer

The formal assertion that addiction equals driving-inability, which is largely practiced at present, is inadmissible and therefore harmful to the therapeutic efforts for rehabilitation.

Functional potential of the methadone-maintenance person.

Gordon, N., & Appel, P. (1995, January). Functional potential of the methadone-maintenance person. Alcohol, Drugs & Driving, 11(1), 31-37.

Surveys on employability and driving behavior of MTSs revealed no significant differences when compared to normal population. It is concluded that MM at appropriate dosage levels, as part of treatment for heroin addiction, has no adverse effects on an individual's ability to function.

The influence of analgesic drugs in road crashes.

Chesher, G. (1985, August). The influence of analgesic drugs in road crashes. Accident Analysis & Prevention, 17(4), 303-309.

Methadone, as used in treatment schedules for narcotic dependence, produces no significant effect on measures of human-skills performance.

Influence of narcotic drugs on highway safety.

Gordon, N. (1976, February). Influence of narcotic drugs on highway safety. Accident Analysis & Prevention, 8(1), 3-7.

A review of the literature on narcotic drug use and driver safety indicates that narcotic users do not have driving safety records that differ from age-matched individuals in the general population. Maintenance on methadone also does not appear to increase driving risk.

A 1994 study by Norman B. Gordon conducted laboratory tests assessing reaction times, attention span, motor skills and intellectual functioning of methadone patients, and also looked into driving records dating back to the early 1970s in order to determine how methadone affects driving.

He found that "maintenance on methadone at appropriate dosage levels, as part of treatment for heroin addiction, had little if any effect on ability to function in any capacity for which the person is qualified."

A 1997 report by Philip W. Appel and Herman Joseph stated that "no restriction should be placed on the driving privileges of individuals maintained on methadone."